Integrating The Monorail

NEIGHBORHOODS & BUSINESSES

DEIS Comments

City of Seattle Comments on the Seattle Monorail Green Line Draft Environmental Impact Statement

October 2003

City of Seattle

OVERVIEW

The City's DEIS comments related to Displacements and Relocation, Land Use and Neighborhoods, Economics, Visual Quality and Aesthetic Resources, and Noise and Vibration, and Cultural Resources are assembled in this comment section to emphasize the relationships between these different impacts on neighborhoods & businesses.

DISPLACEMENTS & RELOCATION

Impacts & Mitigation

The DEIS states an "apartment vacancy rate of 8.4 percent for Seattle overall." (4-99) In order to more accurately portray the impact on displaced renters the FEIS should state the apartment vacancy rate for the specific submarket in which the displaced units are located. Statement about high vacancy rates does not identify whether the vacancy rate is city-wide, regional, or neighborhood. If the vacancy rate is small within the neighborhood where the relocation takes place, will there be an impact on relocated businesses or residents if they must be relocated to a different area within the city? (also applies to Cumulative Section, p. 465)

The FEIS address relocation issues such as costs to businesses related to relocation planning, search costs, loss of business during the move, a re-establishment period, a working capital loan program, and compensation for comparable tenant improvements.

The identified potential loss of up to 100 residential units is not supportive of adopted plans and policies. The Comprehensive Plan (Housing Element) HG1 states "Accommodate a range of 50,000 to 60,000 additional households over the next 20 years covered by this plan". H9 states "Promote housing preservation, development and housing affordability in coordination with transit plans and in proximity to light rail stations and other transit hubs".

A potential mitigation for the displacement of housing would be for SMP to offer surplus property for the development of housing or mixed-use projects to replace some or all of the units lost through Green Line construction.

LAND USE & NEIGHBORHOODS

Methodology & Analysis

The FEIS must provide analysis of the consistency of the station and operations center alternatives with respect to land use, height, bulk and scale, and the specific development regulations that apply within the relevant area. The City recognizes that additional detail with respect to these issues may be provided as supplemental information with Master Use Permit submittals.

The specific types of direct and indirect land use and neighborhood impacts are listed in the introduction to the Land Use & Neighborhoods section (4-117). However, the segment-specific sections do not provide analysis with respect to list of issues or specific analysis of neighborhood impacts. The FEIS should provide analysis related to these issues, likely drawing on the analysis provided by the SMP urban design and station design program.

The State Environmental Policy Act (SEPA) identifies two separate environmental elements: 25.05.675G (height, bulk and scale) and 25.05.675J (land use). These should be addressed separately within the land use section. Identifying compatibility with uses should be distinguished from compatibility with height, bulk and scale. The DEIS finds that the Green Line is compatible with every area with respect to uses. The FEIS should support this finding with respect to uses, as distinguished from height, bulk and scale. Compatibility with scale can be best explained by first describing the scale of the existing built environment, including both typical height and bulk. Note that the zoned height of an

area is not generally described in the text, but only in tables. It would be helpful to state the zoned height and compare it to the height of the proposed structures. The most accurate description would characterize the scale of the majority of the structures in a given area. If a majority of buildings in an area are high-rise, then it is reasonable to call it a high-rise area. If only one or two buildings are high-rise and the remainder are one-story, then the scale of the area is one-story. However, throughout the descriptive sections of Land Use, areas are characterized without reference to the scale of the majority of buildings, or even a significant minority.

For example, at 4-138, where the Alaska Junction area is described as "transitioning to high- and medium density residential," only one example of a high-rise building is given ("a senior apartment building at the corner of 42nd and Alaska.") Another example of this is Morgan Junction, where representative uses include "mid-rise apartment buildings." In addition, where SMP has used terms such as mid-rise or high-rise, a definition at the beginning and in the glossary would be helpful, such as "high-rise is defined as 10 or more stories"; "mid-rise is defined as between 5 and 10 stories." These issues should be addressed with respect to bulk as well as to scale, comparing the bulk of the Green Line facilities to the bulk of existing structures in an area.

Among the planning objectives developed by SMP is "for support of existing and future land use" (3-10). Has this analysis been done for each station? In the land use section, analysis is based on consistency and lack of conflict with adopted plans and regulations. Is a differentiation possible based on "support land use" that results in differences among alternatives that could inform the decision-maker?

Throughout the DEIS, the statement is made that the project is not incompatible with planned uses. However, in the Project Description section, under Planning Objectives, the stated goal was identified as "supporting existing and future land uses." The FEIS should provide analysis to show how the project supports land uses, as distinguished from not being incompatible with those uses.

In numerous places throughout the Land Use & Neighborhoods section, the statement is made that the "aerial nature of the guideway would not physically isolate the community." This statement does not provide any analysis nor does it address whether the columns or station structures could isolate parts of the neighborhood.

The DEIS concludes that some land use impacts are outweighed by projected transportation and related benefits, but no supporting evidence or examples are provided (4-139). If the conclusions are supported by analysis in other sections, the FEIS should cross-reference the section and page number.

The DEIS states that the Green Line supports policies encouraging land use patterns that support transit (4-156). The FEIS should provide analysis that shows how the Green Line encourages these land use patterns. More information is necessary about how the Green Line's service to urban villages and connections to the downtown core will encourage transit supportive land use patterns as compared to, e.g., encouraging transit-oriented development around Green Line stations.

Impacts & Mitigation

Station footprints were difficult to analyze in terms of functionality, particularly for bicycle and pedestrian access. We recommend both an existing conditions footprint and a station footprint to better see impacts and mitigation. The station footprint plans could incorporate the circulation plan recommended in the Transportation section of the City's comment letter.

Fundamental to the environmental assessment of a project is a clear description of the massing of the proposed development. Maximum station dimensions

for the five typical station types should be provided since precise heights and other dimensions of all stations are not currently known (3-11).

The DEIS does not discuss the potential for the project to cause existing structures and/or lots adjacent to the Green Line to no longer comply with applicable development regulations. Because mitigation for such nonconformities may be necessary, the FEIS should discuss the extent to which such nonconformities will be created (and note that non-conformities would be addressed in greater detail during permitting). Therefore, the FEIS should identify where partial takes may result in nonconformities with respect to development standards such as parking. This is both a land use and economic impact, since nonconformity will prevent expansion of the store and may reduce customer use; please cross-reference accordingly. The FEIS should also cross-reference construction impacts here - will these uses remain viable after a partial take of their parking and a number of months of construction impacts?

With respect to mitigation, the mitigation section at 4.3.3 does not carry forward what appear to be proposed mitigations throughout the rest of the chapter. If those other proposals are mitigations, the FEIS should state so positively and carry them forward to 4.3.3. If they are not proposed mitigation, then the resulting impacts (because there is no mitigation provided) should be listed under impacts of the project. Generally, wherever mitigation is proposed, the FEIS should provide a range of mitigations that can be considered when permit applications are being reviewed. The City's SEPA ordinance suggests possible mitigations in certain areas.

The DEIS states that noise, visual and air quality impacts have been considered with respect to their effect on land use. (4-117) The FEIS should carry forward the analysis of those impacts to the land use section on significant adverse impacts. The FEIS should clarify whether the statement in 4.3.4 that there would be no significant adverse unavoidable impacts assumes that all mitigation proposed in the previous section and other relevant sections has been implemented.

Throughout the section, the argument is made that although there are specific impacts, the benefits outweigh those impacts. For example, see the sentence at the bottom of 139 continuing to the top of 140. The statement is made that there are "no impacts... given the benefits." This methodological approach is flawed. The impacts should be identified separately from any benefits so that the decision-maker can weigh and balance them against each other. While the benefits may outweigh the impacts, that decision should be made after considering all the impacts separately, understanding how they are to be mitigated if mitigation is possible, and only then weighing the remaining impacts against the benefits, if any, promised by the project. The benefits do not make the impacts disappear; and although the benefits may ultimately outweigh the impacts, they need to be identified first so that a balanced judgment can be made.

Specific land use impacts relating to termini stations should be disclosed (4-140, 4-154).

In Section 4.3.4 - Significant Unavoidable Adverse Impacts, does the statement that there would be no significant unavoidable adverse impacts assume that all of the mitigation suggested in the previous section is implemented?

It is unclear from reading the cumulative transportation and cumulative land use sections whether SMP is projecting potential growth in excess of growth projections (4-463/5); this should be clarified in the FEIS.

ECONOMICS

Business Impacts and Mitigation

The section does not fully address the impacts of construction on affected businesses. The FEIS should include a

section on construction mitigation for businesses. Another impact not sufficiently addressed is the construction impacts on freight mobility. Construction of the project would most likely adversely impact the connection between the Greater Duwamish and Ballard-Interbay-North End manufacturing and industrial centers.

There will likely be a during- and post-construction impact on ingress and egress to businesses along the alignment. This is pronounced in the industrial and manufacturing areas that the monorail will bisect. Truck maneuverability and turning radii need to be maintained both pre- and post- construction to keep the freight community functioning.

The station descriptions in Chapter 3 make no mention of the potential for new businesses in stations and the affect on other neighboring businesses. Given the footprint of stations (in Appendix L of the DEIS) there would appear to be space for street-level businesses at many of that stations. Is rental/lease space going to be made available at some or all stations? If so, what would be the impacts on neighboring businesses (4-168)?

Government Impacts and Mitigation

Revenues to Local and State Governments. Revenue losses from removed parking meters should be identified in the FEIS. Examples include revenues from meters along 5th Ave N, 5th Ave, Stewart St, 2nd Avenue. For instance, in 2002, parking meters in this area generated $590 per meter per year along 5th Ave N and $1280 per meter per year along 5th Ave. In 2002, parking meters in the Downtown segment raised about $1,250 per meter per year (4-162). However, if parking mitigation measures along the Green Line are implemented and include the installation of new paid parking technology, these can also be identified and considered in the net impact to revenues in the FEIS.

VISUAL QUALITY & AESTHETIC RESOURCES

Methodology

The DEIS indicates that FHWA visual impact methodology was employed in the analysis of Green Line impacts (4-170). However, the application of the methodology is not evident in the document. At minimum, visual impacts should be individually assessed in terms of Visual Quality, Viewer Response, and Visual Character before an assessment can be made of the significance of an impact.

Where visual simulations are used to depict shade and shadow impacts, the shade and shadow impacts of the guideway, columns and stations do not appear to be fully captured; the FEIS should provide additional detail. (Appendix M – Visual Simulations)

Visual Quality and Historic Resources

The loss of historically significant buildings through demolition should be treated as an impact with adverse effect. Loss of the building fabric alters the contextual setting, streetscape, and interpretation of adjacent historically significant buildings, and in the long-term diminishes the historic character of a particular area through loss of building fabric.

The impact to historic resources is not limited to Pioneer Square, the Visual Quality section of the FEIS should identify other areas of impact rather than referring the reader to the Cultural Resources section (4-218).

Streetscape

In discussing mitigation measures, in section 4.5.3.1, it is not clear why this section is labeled "Operation," as it describes design alternatives that could mitigate impacts. This section briefly addresses some of the architecture, urban design and landscape principles and criteria that have been more fully developed by SMP and should be more

extensively and definitively incorporated into the FEIS (such as replacing "could" statements with "would" or by incorporating these design principles and criteria into the project description).

Additional potential mitigation that should be described in this section includes: integration of street signage, street lighting, traffic signals and other above grade utilities into monorail columns and stations; integration of bus shelters, newspaper vending, pedestrian lighting, waste receptacles, and wayfinding signage into monorail columns and stations; and undergrounding of overhead utilities.

The removal of street trees could be a significant unavoidable adverse impact in several segments of the alignment where street trees are mature and comprise a significant feature of the neighborhood setting (4-218/219).

The visual simulations in Appendix M show only the trees removed that would be in the footprint of the guideway. Construction may require that more trees and landscaping are removed or destroyed than is depicted in the photos. In this respect, the photos may be misleading.

The DEIS mentions that glare from reflective surfaces on trains or stations "could be mitigated by using low-reflectivity materials or screening, using low-intensity down-cast lighting" (4-207). Similarly, the DEIS discusses mitigation through spacing of columns (4-217). Yet, there is no mention of these possible measures in the mitigation section of the Visual assessment (4.5.3). The mitigation section should reflect this proposed mitigation.

NOISE & VIBRATION

Vibration – Methodology & Analysis

The vibration impact analysis of section 4.7 omits an assessment of vibration-induced noise. Where sensitive receptors are adjacent to the guideway, the FTA Transit Noise and Vibration Assessment guidelines (abbreviated as FTA Report 1995 in the following review comments) may not provide adequate means of addressing this issue. Both McCaw Hall and Benaroya Hall are extremely sensitive to low frequency noise generated by ground-borne vibration. Recordings made in these facilities require very low noise environments, less than NC 15 to NC 20. Benaroya Hall is isolated from ground vibration originating from the rail tunnel beneath it. However, the propagation path for surface and near surface vibrational waves may affect the structure of both halls, and Seattle Center theaters, in an anomalous manner. A more detailed assessment method is required. The discussion on page 4-257 should be amended to include the potential risks of this noise source and the need to analyze the issue further during final design.

Ground propagation tests are commonly required for transit projects, and recently were conducted for Sound Transit's Link light rail and Dallas Area Rapid Transit (Texas). Vibration propagation measurements for Sound Transit characterized the vibration characteristics of subsurface material at selected sensitive locations. The resulting propagation curve (known as the mobility transfer function) is combined with the known characteristics of the light rail vehicle and its track bed to predict future vibration levels at locations along the project corridor. As the project proceeds into design and permitting, equivalent studies will be needed to properly represent vibration risks at the most sensitive sites along the monorail route and provide appropriate mitigation.

Because of the variability of ground propagation characteristics, and the unknown frequency-dependent nature of ground propagation at these sites, the only reliable means of determining the risk of vibration-induced noise are either a) site-specific test, utilizing a known force transducer driving the ground at a setback and depth comparable to the foundation locations for the monorail columns, or b) a determination of the spectral force density and transfer mobility curves. Refer to FTA

report, sections 11.2 and 11.3, for a description of this methodology and its validity.

Option a) or b) are required to adequately determine the risk of vibration impacts. Implementing Option b), Sound Transit has conducted a series of transfer mobility measurements, at receiving point's on-grade and in structures above grade, to determine site-specific ground propagation characteristics, which vary naturally from one site to another, depending on subsurface soil and geologic features. Such tests should be conducted adjacent to the most sensitive facilities bordering column foundations for the Green Line alignment. The force density of the monorail is not known, and should be measured as well, either along the Seattle Center line, or at the Bombardier Mark VI monorail in Orlando, Florida. The combined results of the transfer mobility data, at specific future support column sites, and Seattle or Orlando monorail force density data, permits a reliable prediction of the vibration spectrum.

A valid prediction of the ground vibration spectrum is required to assess the risk of excessive low frequency vibration and low frequency noise at sensitive receivers (Seattle Center, and Benaroya Hall). The DEIS analysis of vibration uses other means of determining vibration propagation, namely a simplified estimate derived from standard (averaged) distance propagation curves, as contained in the FTA Report. This method of determining expected vibration levels is open to the risk of underestimating the expected vibration. A new vibration assessment, using option a) or b) should be provided. Specific review comments of the simplified estimating method are provided, below, to indicate where errors and uncertainties lie in the application of this simplified method. Only if there is clearly no risk of vibration impact to a specific receiver would the averaged propagation method be considered adequate.

Measurement of horizontal ground vibration motion has not been provided. Measurements should be made to demonstrate whether this vibration is comparable to the vertical motion, or not.

Vibration events have impacts in two dimensions: the strength of the event, and its frequency of occurrence. If vibration events are widely spaced in time (infrequent), the project's affects on adjacent structures and occupants is lower. No occurrence rate analysis has been provided. The SMP website notes that "Trains will run every 4-5 minutes at peak hours, 8-10 minutes off-peak; could add trains to run every 2 minutes." An analysis of vibration energy events, based on numbers of wheel axles per train and expansion joint spacing, should be included in the EIS, and should use the system's potential peak hour train frequency (2 per minute), or 1 per minute in both directions, to develop an impact assessment of the frequency of occurrence of vibration events. See the FTA Noise and Vibration Report, pp. 8-1 to 8-5 for guidance in assessing frequency of event impacts.

Section 4.7.1.5, paragraph 1: The FTA Report is a major guideline document, but is not the sole reference for criteria to judge environmental impacts, as required by NEPA, SEPA, and subsequent regulations. This is especially so for vibration impacts to sensitive receivers, such as research facilities, biotechnology campuses with microscopes, microchip manufacturing, surgery suites in hospitals, and low-noise environments of recording studios, concert halls, and theaters for drama. The DEIS should be revised to include the incorporation of the full environmental standards for vibration as accepted in standard architectural design practice for the vibration sensitive building types listed above.

In Section 4.7.1.5, paragraph 3: At the end of the paragraph, it is noted as follows: "The vibration propagates from the foundation throughout the remainder of adjacent building structures." The remainder is

presumable the upper floors. This should be clarified in the FEIS. Furthermore, the DEIS not mention that vibration may cause resonant responses in upper floors of adjacent structures, increasing vibration levels by up to 10 dB at low frequencies (FTA Report). This risk for sensitive receivers should be assessed in the DEIS.

Vibration Criteria for Special Buildings: The criteria cited under this heading are general in nature, and are useful in the screening process to identify potentially affected structures. It is not sufficient for determining the risk of excessive vibration or vibration-induced noise. This should be stated in the text of the DEIS (4-237).

Section 4.7.1.6, paragraph 2: Damping is usually limited to internal damping as the vibration propagates in rock and soil. The "high degree of vibration damping" cited for the guideway supports and foundations is not substantiated with supporting data in section 4.7 nor in Appendix R. The claim of a high degree of vibration energy loss should be justified, or removed. Damping as a technical term should not be used except for internal soil losses, unless further explained.

In Section 4.7.1.6 (third paragraph), the DEIS claims that the older Seattle Center monorail produces more vibration than would the future SMP vehicles; supporting documentation should be included in the FEIS.

In Section 4.7.1.7 (first paragraph), the claim that the train's suspension systems will reduce vibration is questionable. The newer suspension systems may increase vibration at the ground. Suspension systems can increase the vibration levels at speeds above 25 km/h (15 mph), as reported by Hunaidi and Tremblay (1997), Canadian J of Civil Eng, 24: 736-753. Hunaidi and Tremblay found that transit bus suspensions, designed for human comfort over bumps, typically double the velocity amplitude of ground vibrations, and upper floors of structures responded at higher vibration levels than the foundations.

In Section 4.7.1.8 (third paragraph), the DEIS claims the Green Line guideway would be smoother than the existing Seattle Center Monorail Guideway; this also should be supported by documentation in the FEIS.

The lateral foundation loads should be considered on adjacent utilities (4.16.2.7).

The FEIS should consider dynamic (vibratory) foundations loadings due to train operation over time. Close utilities could be impacted from vibration induced settlement (4.16.2.7).

Vibration – Impacts & Mitigation

In Section 4.7.1.8, the concluding sentence claiming lower vibration levels at almost all locations and times is premature given the above comments and concerns.

Section 4.7.2.3 should also include the impact to sensitive utilities not just buildings. The FEIS should consider dynamic (vibratory) foundation loading due to train operation. Nearby utilities could be impacted from vibration induced settlement.

Section 4.7.2.3 should also include the impact to cast iron water mains with lead joints; they can be very sensitive to disturbances as described in City of Seattle Standard plan section 1-07.16(1).

Noise – Methodology & Analysis

The operation of the monorail must meet the Seattle Noise Ordinance objective standards stated in section 25.08.410.

The noise analysis must include air brake noise when train is in operation; areas of concern are stations and areas where the train reduces speed.

In Section 4.7.1.6 and 4.7.1.7 the FEIS should provide further evidence to support the claim that the new expansion gaps will be smoother. Fewer expansion joints in a given length of guideway usually means larger gap sizes at each joint to

accommodate greater movement, not smaller gaps, as implied. In addition, longer spacing of expansion joints is more susceptible to vertical misalignment, due to differential foundation settlement. A discussion of this risk should also be included in the FEIS.

Noise – Impacts & Mitigation

The statement that "residential location with an existing 40 dBA Ldn would not be considered affected unless project noise would be 15 dBA or more higher than existing" needs clarification as to why a 10-15 dBA increase is not a significant increase. This is a more than doubling of noise levels to a quiet environment (4-230).

In Section 4.7.3.1, shielding is discussed. The FEIS should identify where will the shielding be placed; for example, on the train, along the rail, at the stations, on the residences.

In section 4.7.3.1, there is a statement about special mitigation measures. The FEIS should identify when this will happen if needed, for example, before construction, after construction or after train is in operation.

It is unclear from the DEIS if SMP is committing to implement effective noise mitigation measures. Given that all of the significant adverse impacts are to residential properties, it would seem likely that mitigation is required (4-275 and 4-276).

CULTURAL RESOURCES

Within the Cultural Resources chapter and Appendix N drafts there are discrepancies between information and findings conveyed in the charts and tables, and the narrative body, omissions and only partial summaries in the narrative body of material contained within the tables and charts, and conflicts between the information presented in the tables, charts and narrative body and the conclusions reached regarding levels of effect, impact, and resource significance.

Methodology & Analysis

The FEIS should clarify in references throughout Section 4.11.2 (Methodology: Historical Resources) that the review for City of Seattle Landmark eligibility was conducted only for properties to be demolished; Appendix N makes it clear that City of Seattle Landmark eligibility review was conducted only for properties to be demolished.

Impacts & Mitigation

The DEIS states that secondary impacts from other environmental areas (i.e. visual, noise and vibration) will not adversely effect historic resources (4-325); however, these secondary impacts are not defined in the other sections or in Appendix N. These secondary impacts should be defined, particularly in the noise and vibration section where non-specific engineering information regarding the physical scale and operation of the system suggest that proximity and tolerances between fragile architectural features may become an issue as more project design details emerge.

Construction monitoring in additional locations beyond those categorized "high probability" is recommended. A randomly chosen, statistically defensible sample of those areas with a lesser probability of bearing significant historic or prehistoric deposits (but still viable, based on local depositional history), would allow for both resource protection and future methodological assessment. Sub-surface resources warrant added vigilance based on their extreme vulnerability during construction and the difficulties in planning and protection for this resource type. Given the current plan where only high probability areas are monitored (i.e. provided only the minimum level of protection), if resources are found and data recovered, they will add to what we know in areas where some historic or documented information is probably already available. If significant resources come to light in other areas impacted by the Green Line, new information will be gained for less well

documented land use, and the predictions possible for future work will be further refined. Practice has shown that isolated finds of certain types can be highly significant, and significant findings are frequently encountered in unexpected places.

The DEIS states loss of access, change of function, and neglect would not result in long-term adverse effect due to the location of the properties in a highly urbanized area (4-334). This loss of access would be critical, particularly if construction of the Green Line coincides with the Viaduct, or in areas with concentrated historical resources such as Pioneer Square. The loss of economic viability due to an unmitigated construction process would increase the potential for historic building resale for development purposes and the buildings' ultimate demolition in favor of new construction deemed more economically viable for the location. Construction interrupts and strains the tenuous hold on economic sustainability maintained by historical resource property owners in highly urban areas where competition for development of limited land is strong.

There would be a significant unavoidable effect to the visual character of downtown streetscape, historical resources along the Green Line (4.11.5.2).

Specific mitigation measures are not well developed or affirmatively stated, while the model for predicting where significant resources are most probable is excellent (4-341). Construction monitoring constitutes only a first step as a mitigation measure. It simply locates those locations where immediate further mitigation may be necessary. The development of additional planning measures, including a Programmatic Agreement, monitoring plan, and detailed treatment plan as noted in section 4.11.5.1, are critical to the FEIS.

Supplemental Treatment Plans should include a plan for wet site data recovery, since specialized techniques and equipment are required. Additionally, since fill areas carry a higher probability of hazardous materials, supplemental plans should also include a plan for coordination with Hazardous Materials specialists for the identification of locations with known hazards and testing for hazardous materials should data recovery become necessary. Training requirements for workers should also be outlined, and staff prepared in advance for this eventuality.

With regard to mitigation, remediation measures such as cleaning and repointing of masonry, assessment of glazing and window frame conditions and restoration of architectural detailing along the upper levels of historic buildings immediately adjoining guideway would be appropriate measures given the effect the construction will have on adjacent buildings.

Specific mitigation discussed among SMP and its consultants, the Washington State Historic Preservation Officer and the City of Seattle Historic Preservation Officer were not limited to the measures discussed in the DEIS and the Memorandum of Agreement should not be limited to those measures referenced in the DEIS (4-341-344).

In discussing demolition, the FEIS should be more definitive about impacts. For example, the sentence reading "Some of the alternatives could result in the demolition of historic resources" (4-341) should read "Some of the alternatives will result in the demolition of historic resources."